

DIESEL FUEL PRICES: WHAT CONSUMERS SHOULD KNOW

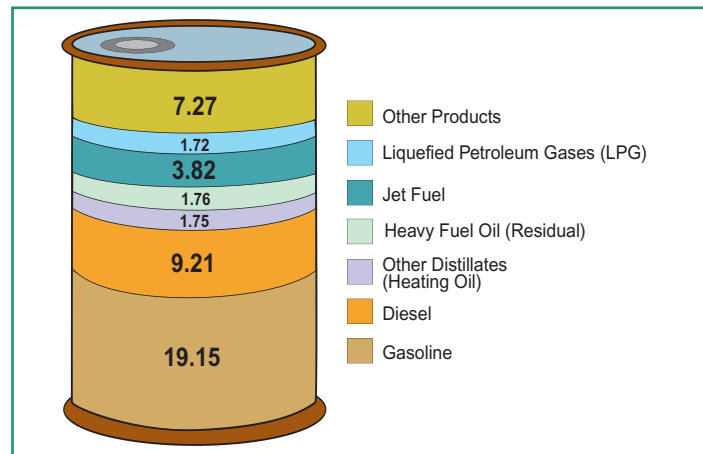
INTRODUCTION

Diesel fuel is the common term for the motor vehicle fuel used in the compression ignition engines named for their inventor, the German engineer Rudolf Diesel, who patented his original design in 1892. While diesel engines are capable of burning a wide variety of fuels, (see Biodiesel below) diesel fuel refined from crude oil is the most widely used today. Diesel fuel is important to America's economy, quality of life, and national security. This Energy Information Administration (EIA) brochure discusses the factors that affect and determine diesel fuel prices.

How Diesel Fuel Is Made

Petroleum diesel is a "distillate" refined from crude oil. There are various grades or types of distillates, but Number 2 (No. 2) distillate is the primary source for the motor diesel fuel consumed in the United States. It is also used as a fuel oil for heating buildings and by industry. Diesel fuel is No. 2 distillate with a relatively low sulfur content. New U.S. Environmental Protection Agency (EPA) standards for diesel fuel sulfur content were implemented in 2006. By June 1, 2006, 80 percent of the on-highway diesel fuel sold in the United States had to be Ultra-Low Sulfur Diesel (ULSD) fuel with a sulfur content of no more than 15 parts per million (ppm), replacing most Low Sulfur Diesel (LSD) fuel, which contains a maximum of 500 ppm sulfur. By December 1, 2010, all on-highway diesel fuel must be ULSD fuel. The diesel fuel standards for off-highway consumption began a phase-in period in 2007. Nearly all diesel fuel used in the United States will be ULSD by the end of 2014.

Figure 1. Products Made From a Barrel of Crude Oil (Gallons)



Source: Energy Information Administration.

Biodiesel

One of the fuels that Rudolf Diesel originally considered for his engine was vegetable seed oil, an idea that is now coming back as so-called "biodiesel." Biodiesel can be manufactured from vegetable oils, animal fats, or recycled restaurant grease. It is biodegradable and can reduce vehicle emissions of particulates, carbon monoxide, and hydrocarbons. Blends of 20 percent biodiesel with 80 percent petroleum diesel (B20) can generally be used in unmodified diesel engines. Biodiesel may be one of the "additives" used to improve lubricity of ULSD fuel, which is negatively affected by the removal of sulfur to meet the ULSD standards. Biodiesel production increased from very little 10 years ago to about 75 million gallons in 2005 and to about 450 million gallons in 2007. Most biodiesel is produced from soybean oil at about 105 facilities and is available in every State. (Source: National Biodiesel Board; www.biodiesel.org) More information on biodiesel is available on the web site of DOE's Office of Energy Efficiency and Renewable Energy: www.eere.energy.gov/afdc/altfuel/biodiesel.html.

How Diesel is Used

Nearly all semi-trucks, delivery vehicles, buses, trains, ships, boats and barges, farm, construction and military vehicles and equipment have diesel engines. In 2007, diesel fuel accounted for about 18 percent of total refined petroleum products and 82 percent of the total distillate consumed in the United States. On-highway motor vehicles use about 75 percent of total diesel fuel, with the rest consumed by "off-highway" construction, farming equipment, military and railroad vehicles and equipment, and marine craft.¹

¹ Sources: Petroleum Supply Monthly February 2008 with data for December 2007 (www.eia.doe.gov/oil_gas/fwd/psm.html) and Fuel Oil and Kerosene Sales 2006 (www.eia.doe.gov/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/foks.html)

Where Diesel Fuel Comes From and How It's Supplied to Retailers

Most diesel fuel consumed in the United States is produced in U.S. refineries. In 2007, about 4.5 percent was imported from foreign countries, mainly Canada, and the Virgin Islands. U.S. refineries produce diesel fuel from domestically produced and imported crude oil, of which about 66 percent was imported in 2007. Most diesel fuel is transported by pipeline (some by barge and rail) from refineries and ports to terminals near major consuming areas, where it is loaded into tanker trucks for delivery to retail service stations.

WHAT ARE THE COMPONENTS OF THE RETAIL PRICE OF DIESEL FUEL?

The cost to produce and deliver diesel fuel to customers includes the costs of crude oil, refinery processing, marketing and distribution, and retail station operation. The retail pump price reflects these costs and the profits (and sometimes losses) of the refiners, marketers, distributors, and retail station owners. The relative share of these cost components to the retail price varies over time and among

regions of the country. Figure 2 illustrates the percentage share for each major cost element of the national average retail price as of May 2008.

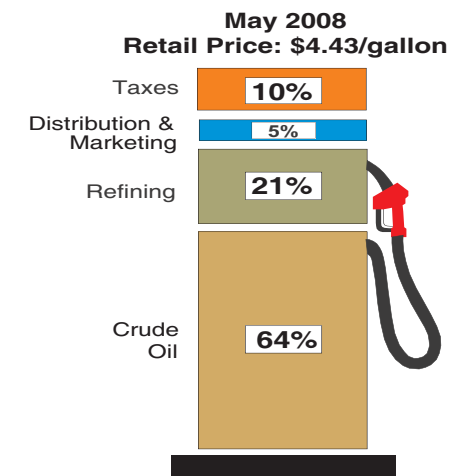
The price at the pump also includes Federal, State, and local taxes. In 2008, Federal excise taxes were 24.4 cents per gallon and State excise taxes averaged about 22.0 cents per gallon.² Some States and county and city governments levy additional taxes. The retail price also reflects local market conditions and factors such as the location and the marketing strategy of the owner. Some retail outlets are owned and operated by refiners, while others are independent businesses that purchase diesel fuel for resale to the public.

² Energy Information Administration, Petroleum Marketing Monthly, April 2008, Explanatory Notes, Table EN1 (www.eia.doe.gov/oil_gas/fwd/pmm.htm).

Why are diesel fuel prices higher than gasoline prices?

Historically, the average price of diesel fuel has been lower than the average price of gasoline. However, this is not always the case. In some winters where the demand for distillate heating oil is high, the price of diesel fuel has risen above the gasoline price. Since September 2004, the price of diesel fuel has been generally higher than the price of regular gasoline all year round for several reasons. Worldwide demand for diesel fuel and other distillate fuel oils has been increasing steadily, with strong demand in China, Europe, and the United States, putting more pressure on the tight global refining capacity. In the United States, the transition to ultra-low-sulfur diesel fuel has affected diesel fuel production and distribution costs. Also, the Federal excise tax on diesel fuel is 6 cents higher per gallon (24.4 cents per gallon) than the tax on gasoline.

Figure 2. What We Pay For in a Gallon of Diesel Fuel



Source: Energy Information Administration.

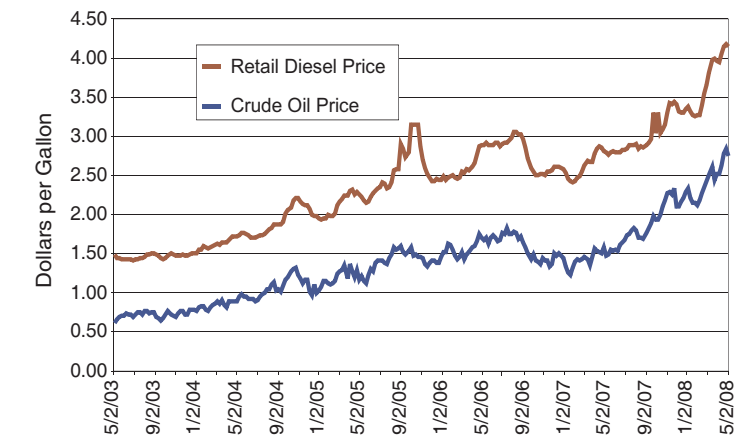
WHAT ARE THE MAIN FACTORS THAT AFFECT DIESEL PRICES?

Besides excise taxes, the following are the main factors that affect diesel fuel prices:

Cost and supply of crude oil: Crude oil prices are determined by worldwide supply and demand, and over the past few years increasing demand has put intense pressure on available supplies. The Organization of Petroleum Exporting Countries (OPEC) exerts significant influence on prices by setting an upper production limit on its members who produce about 40 percent of the world's crude oil. OPEC countries have essentially all of the spare production capacity, and possess about two-thirds of the world's estimated crude oil reserves. Prices spike in response to disruptions in the international and domestic supply of crude oil, such as the Arab oil embargo in 1973, the Iran/Iraq war in 1980, the current war in Iraq, unrest in the Niger River delta region of Nigeria, and the hurricanes in the Gulf of Mexico in 2005.

Tight refining capacity and international diesel fuel demand: U.S. refineries have been operating at around 90-percent capacity over the last 10 years. Most other countries rely even more heavily on distillates and diesel fuel than does the United States, and refining capacity is tight worldwide. U.S. diesel fuel prices are more and more affected by competing international demand for refined distillates.

Figure 3. Diesel Fuel Prices Follow Crude Oil



Source: Energy Information Administration.

Product supply/demand imbalances: Prices of transportation fuels are generally more volatile than prices of other commodities because the U.S. vehicle fleet is so heavily dependent on petroleum and few alternative fuels are available. If supply declines unexpectedly due to refinery problems or lagging imports, diesel inventories (stocks) may

decline rapidly. When stocks are low and falling, some wholesalers and marketers may bid higher for available product. If the diesel fuel transportation system cannot support the flow of surplus supplies from one region to another quickly, prices will remain comparatively high. These are normal price fluctuations experienced in all commodity markets.

Seasonality in the demand for diesel fuel and distillates: While U.S. diesel fuel demand is fairly consistent and generally reflects the overall health of the economy, prices tend to gradually rise during the fall, decline in the late winter, rise through the early spring, and then drop a bit in the summer. Seasonal upward pressure on diesel prices also results from demand by farmers in the summer, cold weather in the winter, and stores building up inventories during the winter holiday season.

Transportation Costs: Transportation costs generally increase with increasing distance between the retail location and distribution terminals and refineries. Areas farthest from the Gulf Coast (the source of nearly half of the diesel fuel produced in the United States) tend to have higher prices.

Regional operating costs and local competition: The cost of doing business by individual dealers can vary greatly depending on where the dealer is located. These costs include wages and salaries, benefits, equipment, lease/rent, insurance, overhead, and State and local fees. Even retail stations next to each other can have different traffic patterns, rents, and sources of supply that affect their prices. The number and location of local competitors can also affect prices.

OUTLOOK FOR 2008 AND 2009

Retail diesel fuel prices are likely to remain elevated as long as crude oil prices and world demand for distillate fuels remain high. According to EIA's June 2008 *Short-Term Energy Outlook*, national average retail diesel fuel prices will peak in the third quarter of 2008 at \$4.75 before falling to \$4.11 per gallon by the fourth quarter of 2009, primarily due to the forecast for the price of West Texas Intermediate crude oil to average between \$121 and \$133 per barrel during this same period. However, the recent volatility seen in crude oil and petroleum product prices, if continued, may significantly alter these price projections.

The phase-in of the U.S. Environmental Protection Agency's (EPA) sulfur standards for diesel fuels has the potential to continue to influence diesel fuel prices. The logistics of delivery of ULSD to retail service stations can be a challenge. Most ULSD travels through pipelines on the way to bulk terminals for final transfer by tanker truck to retail stations. Other diesel fuels and petroleum products with a higher-sulfur content in the pipeline, storage, and local distribution systems might contaminate ULSD (jet fuel, for example, can have 3,000 ppm of sulfur). If contaminated, it may not be possible to correct a ULSD fuel

batch by blending with additional low-sulfur product, and contaminated batches have to be returned to a refinery for reprocessing, a difficult and expensive problem. Even without potential delivery problems, it costs relatively more to produce ULSD fuel.

Why are West Coast diesel fuel prices higher and more variable than others?

Diesel prices on the West Coast, especially in California (CA), are relatively higher than other regions of the country, partly because of taxes, but mainly because of supply issues. The State of California assesses a combined State and local sales and use tax of 7.25 percent on top of the 24.4 cents/gallon Federal excise tax and an 18.0 cents/gallon State tax. Washington's tax of 34 cents/gallon is one of the highest in the country. Besides taxes, West Coast retail prices are more variable than others because there are relatively few supply sources: 21 of the 36 refineries located in West Coast states are in CA. California refineries need to be running at near full capacity just to meet in-state demand. If more than one refinery in the region experiences operating difficulties at the same time, the diesel supply may become very tight and prices may spike. The West Coast's substantial distance from Gulf coast and foreign refineries is such that any unusual increase in demand or reduction in supply results in a large price response in the market before relief supplies can be delivered. The farther away the necessary relief supplies are, the higher and longer the price spike will be.

FUEL SURCHARGES

Many transportation companies and freight carriers include a fuel-cost surcharge in their rates and invoices to cover increases in the cost of diesel fuel. There is no Federal regulation of fuel surcharges, and EIA does not calculate fuel surcharges or review fuel surcharge formulas. Companies that apply surcharges use their own formula for calculating their surcharge. EIA's retail diesel price data (see below) are often cited as a reference by companies that have fuel surcharges. Every company has its own method for calculating surcharges. Many major carriers have information on how they calculate their surcharges on their web sites. EIA cannot and does not endorse a particular method, but you can perform an Internet search for "fuel surcharge trucking" for more information.

Every Monday, EIA conducts a survey of retail on-highway diesel fuel prices from a sample of approximately 350 truck stops and retail service stations around the country. The survey results are published by 5:00 p.m. Monday (or on Tuesday when there is a Federal holiday on Monday). The results are compiled into a U.S. average price and average prices for eight regions of the country and California. These survey results are made available through EIA's Motor Fuels Price

Hotline (202-586-6966), EIA's web page, and by E-mail listserves (regular and wireless). You can access the results as well as details on the survey at:

<http://tonto.eia.doe.gov/oog/info/gdu/gasdiesel.asp>

Diesel Fuel Prices

What Consumers Should Know



For more information, you may contact:

National Energy Information Center
Energy Information Administration
1000 Independence Ave., SW,
Washington, DC 20585

Phone: 202-586-8800
Between 9:00am-5:00pm Eastern time

E-mail: infoctr@eia.doe.gov

The Energy Information Administration's web site:

www.eia.doe.gov